η *Argus.*—The Great Nebula about η Argus was first observed by the Great Telescope on 27 Dec. last, and I then note :—" Evident changes in η nebula since Le Sueur's sketches, and I notice a small bright duplicate nebulosity, *s . f .* η, like a small nebulous double star. It is too bright to have escaped previous notice, and is not noted by Le Sueur."

Subsequent observation has corroborated this statement, and it is now beyond a doubt, that the enormous physical changes are still taking place, particularly about the lemniscate, and suspected also in the star η itself. But these changes may form the subject of a future paper, and could be best illustrated by a reference to the sketches made at successive periods by Mr. Le Sueur and myself—comparing also with the drawing executed by Sir John Herschel.

Some observations on Jupiter and Saturn, also may on a future occasion be worthy of your notice, as also, some on the nebula about θ Orionis and others.

Art. XXII.—*Notes on Enhydros found at Beechworth.*

By Geo. Foord, Esq.

[Read April 12, 1871.]

The great mineralogical interest attaching to the curious natural productions called " Enhydros " or " water stones," and the mode of their formation remaining, in many essential particulars, without any adequate explanation, are circumstances which have induced me to believe that any contribution to the knowledge of them, however slight, would prove acceptable, and therefore I offer the following brief note on the subject to your Society.

The sample, the subject of experiment, was a large specimen, weighing over 900 grains, having for its largest section a form closely approaching an equilateral triangle, measuring a little over two inches on each of the sides. For this specimen I am indebted to the kindness of Mr. George H. F. Ulrich. It was, I am informed, obtained from the same site as those described by Mr. Dunn, and it possessed the usual characteristics. The specimen clearly included two separate chambers; in fact, during the course of experiment it was cloven into two separate water stones, of pretty nearly equal dimensions; one of which appears to be quite filled up with quartz crystals, the other containing, besides an inner lining of quartz crystals, also a mobile fluid, and a bubble of air. The air bubble was transferable from place to place within the cavity, as the position of the specimen was altered. The remains of the specimen, which I submit for your inspection, are still in such a state as to convey a fair idea of its original form and character.

To extract the fluid, a fragment was first broken from one of the corners of the stone. This disclosed a fine opening or pore in the quartz lining, connected with the inner cavity. The specimen was now placed under the receiver of an air-pump, and as the exhaustion proceeded the air bubble in the water stone expanding extruded the fluid, drop by drop, through the pore. In all fully eighteen drops of fluid were thus collected in a carefully-cleaned test-glass. The fluid, thus extracted, was perfectly pellucid, but contained a few minute angular transparent fragments, apparently splinters of quartz.

The fluid is water, but slightly mineralized. A single drop evaporated on glass leaves a slight residue, forming a gummy annular outline, but affording distinct evidence of crystallization when examined under the microscope. When 15 drops of the fluid were evaporated in a watch-glass over oil of vitrol in vacuo, the fluid froze, giving out air-bubbles, which vesiculated the icy crust; the ice gradually disappearing left a small residue, nearly white in colour, non-crystalline, and wrinkled on the surface. A few small crystals and some larger (possibly hexagonal plates) were observed in the mass when examined microscopically.

A small crop of beautiful microscopical crystals was obtained on re-solution and spontaneous evaporation. Among these, cubic crystals and crystals pertaining to the cubic system were recognized. On dissolving up the crystals a delicate impress of their form was left —white on a delicately pale yellow ground, as though a deposit of colloidal ferruginous silica remained, with colourless cavities where the crystals had occupied position.

On testing the redissolved saline matter it gave a distinct white flocculent precipitate with nitrate of silver, immediately soluble in ammonia. It also gave a granular precipitate with chloride of barium. With ammonia and oxalate of ammonia a very slight granular precipitate was obtained after some time; and with ammonia, chloride of ammonium and phosphate of soda, a relatively abundant crystalline precipitate, tufts or stellate groups of acicular crystals, was obtained.

A drop of the fluid examined in the spectroscope showed vividly the sodium double line, but no indication of potassium, lithium, calcium, nor indeed of any other metal was apparent. Although the results thus recorded were quite distinct, it is yet to be remembered that the quantity operated upon was but a few drops of water, and that this small quantity was but feebly mineralized. Probably examinations conducted with larger quantities of the fluid of these "enhydros" may show additional reactions. The subject is certainly of sufficient importance to invite further inquiry, if only a sufficient supply of these specimens containing water can be obtained.

As far as my results are to be trusted they show that the fluid in the enhydros is limpid water feebly mineralized with chlorides and sulphates of sodium, magnesium, and calcium, and that a soluble form of silicic acid is also present.

I have heard of some of these stones having an apparently viscid fluid within them. Of course I am unqualified to speak concerning specimens which I have not seen; but, from the motion of the fluid in the few specimens which have come under my notice, and from the perfect limpidity and liquidity of the fluid extracted in two instances, I am inclined to the opinion that the contents as found in the specimen now described will prove characteristic for the whole; especially as a bubble of fluid, moving from end to end within the stone, between closely approaching walls of the enhydros, serrated all over with the summits of quartz crystals, would be much impeded in its motion. It appears to my mind that water moving under these conditions would bear the appearance of sluggish oil.

I have one or two remarks to make concerning the siliceous substance of which these water stones are composed. When the two members originally forming the complete specimen were separated from each other, the cleavage surface presented thin and minute patches of a white substance,—a kind of bloom, mapped over it. When this bloom is removed, the surface of chalcedony beneath is found to be curiously marked with outlines, showing where each little patch has been attached, and the chalcedony is further seen to be laminated in places; in fact, these thin laminæ can be easily detached. When one of these laminæ is examined under the microscope, under an amplification of 90 diameters, it is found that besides this impress of the superficially attached bloom, the horny chalcedony shows also distinct and beautiful indications of regular crystalline structure,—a net-work like a geometrical carpet pattern extending over the whole field.

Now it has occurred to me as possible that this crystalline structure in the chalcedony may afford the key to an explanation of the formation of these paradoxical enhydros, and if speculation, founded however on observation of physical facts, be permissible, I should like to add a few words hinting what these crystalline demarcations have suggested to my own mind. The enhydros have this in common with agates, namely, an exterior of silica in the horny state, for the most part colloidal silica, and an inner layer of quartz crystals. The successive layers in both instances have been deposited from without inwardly; that is to say, the chalcedony or agate first, the interior quartz crystals last; and in the case of agate each layer of agate successively from the exterior layers to the interior ones. The enhydros also agree with agates in showing points of infiltration, some of the enhydros leaking at one of the solid angles.

Now, with agates, it is at least conceivable that water charged with silica and depositing it in a cavity in the amorphous form, would, if the supply were kept up, continue so to deposit it, layer on layer, as long as a full waterway existed; but when eventually by the deposit of this chalcedony or agate, this way is stopped up, thereafter any silica in solution entering into the central cavity must be dialysed by liquid diffusion through the moisture filling the pores of the amorphous silica. For this to take place a solution of silica in both the crystalline and amorphous states is requisite; but this necessity is in agreement with the composition of chalcedony, which is generally admitted to be an intimate mixture of amorphous and crystalline silicic acid. The crystalline character is masked by the colloidal—masked, but not therefore necessarily altogether suppressed. *This, indeed, is the point upon which my suggestion hinges.*

If the crystalline texture observed in the thin laminæ from the outer layers of these enhydros is due to crystalline quartz, we may then ask whether chalcedonies do not differ in the proportions of the amorphous and crystalline consti-

Crystalline Structure of Enhydros

A thin lamina from the exterior of one of the water stones viewed under a magnifying power of 90 diameters.